

## The Incredible Story of Phineas Gage

Phineas Gage (1823–1860) was an American railroad construction foreman remembered for his improbable survival of an incredible accident. In 1848, when he was planting explosives, a large iron rod (called a tamping iron) was accidentally driven completely through his head, destroying his left eye and most of his left frontal lobe. The subsequent effects on his personality and behaviour were profound.



### The Accident

On September 13<sup>th</sup>, 1848, 25-year-old Gage was working as the foreman of a crew preparing a railroad bed near Cavendish, Vermont. He was using an iron rod to pack explosive powder into a hole. Unfortunately, the powder detonated, sending the rod (110cm long and 3.1cm diameter) up into the air incredibly fast. The rod penetrated Gage's left cheek, passed through his brain, and exited his skull. It eventually landed 25 meters away. Phineas not only survived the accident but was also able to speak and walk. His colleagues took him into town to be seen by a doctor. He remained conscious all day and all evening and he seemed to be unaffected by the brutal accident. He told the doctor that he didn't wish to see his friends, because he would be back to work in a day or two.

After developing an infection, Gage spent ten days in a semi-comatose state. On October 7<sup>th</sup>, he got out of bed, and soon after, his intellectual functioning began to improve. His doctor noted that Gage knew how much time had passed since the accident and remembered clearly how the accident had occurred, but he had difficulty with simple arithmetic, such as counting money. After a month, he was well enough to leave his house.

Soon after, Gage went to his parent's house in New Hampshire to recuperate. When the doctor saw Gage again the following year, he noted that while Gage was blind in one eye and had scars from the accident, he seemed to be in good physical health.

## **After the Accident**

After the accident, Gage was unable to continue his job. So he spent some time travelling through New England and Europe with his tamping iron to earn money by talking about his accident. He then worked briefly at a horse stable in New Hampshire and then spent seven years as a stagecoach driver in Chile. At this time his health began to deteriorate, so he moved to San Francisco to live with his mother. After a series of epileptic seizures, Gage died on May 21<sup>st</sup>, 1860, almost 12 years after his accident.

Seven years after his death, Gage's body was exhumed. His brother gave the skull and the tamping iron to Gage's doctor, who subsequently donated them to the Harvard University School of Medicine. They are still exhibited in its museum today.

## **Survival and Recovery**

The type of injury that Phineas Gage suffered should have been fatal. How he survived the accident, recovered from the injury and still functioned as a human being was a complete mystery. Some researchers suggest that the rod's specific path through his brain played a role in Gage's survival. If it had penetrated other areas of the brain, such as the "pterygoid plexus" or "cavernous sinus", Gage would probably have died instantly. Another study suggested that the brain can use non-injured areas to perform functions previously executed by the injured part.

## **Personality Change**

Before the accident, Phineas Gage was an energetic, motivated, hard-working, pleasant, sociable person. But after the accident, his colleagues reported that he was an aggressive, rude person who had become a heavy drinker.

Phineas Gage's accident has influenced many discussions about the mind and the brain, and it was perhaps the first case to suggest that certain parts of the brain determine personality, and that damage to specific parts of the brain might induce specific mental changes.

The Gage accident is well documented in the fields of neurology, psychology, and neuroscience. It is one of "the greatest medical curiosities of all time" and "a part of medical folklore" and is frequently mentioned in books and scientific papers. He even has a place in popular culture.

Gage's most serious mental changes were reversed after many years, so that in later life he was more functional and more sociable than in the years following his accident. It is believed that his work as a stagecoach driver in Chile helped his recovery by providing a daily routine that allowed him to regain his lost social and personal skills.

Sources: [https://en.wikipedia.org/wiki/Phineas\\_Gage](https://en.wikipedia.org/wiki/Phineas_Gage)  
<https://www.verywellmind.com/phineas-gage-2795244>

Suggested video: <https://www.youtube.com/watch?v=vb8Jg1PAL90> (5 mins)